

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic 2016 Integrated Resource Planning Report Of )  
Kentucky Power Company To The Public Service ) Case No. 2016-00413  
Commission Of Kentucky )

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**Kentucky Power Company's Response To The Comments Of The  
Attorney General Of The Commonwealth Of Kentucky, Southern Wind Energy  
Association, And The Sierra Club To The Company's  
2016 Integrated Resource Planning Report**

INTRODUCTION

Kentucky Power Company submitted its 2016 Integrated Resource Planning Report ("IRP Report") to the Commission on December 20, 2016. The IRP Report identified Kentucky Power's Preferred Plan that will allow the Company to meet the projected demand and energy requirements of its approximately 168,000 customers in eastern Kentucky at the lowest possible cost. This resource plan was developed utilizing the Company's rigorously prepared forecasts of customer load requirements, commodity prices, supply-side resource costs, and demand-side resource costs and availability.

Kentucky Power operates in a dynamic and rapidly changing energy market. The Company historically has relied almost exclusively on coal-fired generation to meet its customers' needs. Kentucky Power's 2016 planning process produced a Preferred Plan that represents a shift from the past. The 2016 IRP Report:

- Assumes the continued operation of Kentucky Power Company's existing generation facilities including the Big Sandy 1 (natural gas) and its share of the Mitchell Units (coal-fired) through 2030;

- Assumes the continuation of the Rockport Unit Power Agreement (“UPA”) for a 15% share of the energy and capacity from the Rockport Plant (coal-fired);
- Annually adds 75 MW (nameplate capacity) of wind resources beginning in 2018 for a total of 300 MW by 2021;
- Adds utility scale solar, beginning with 10 MW in 2019, for a total of 130 MW by 2031;
- Implements customer and grid EE programs, including Volt VAR Optimization, reducing by 2031 projected energy and capacity requirements by over 90 GWh and 70 MW, respectively;
- Continues investment in demand-side management programs;
- Assumes Kentucky Power Company’s customers add Distributed Generation (i.e. rooftop solar) capacity totaling 1.1 MW (nameplate) by 2031;
- Adds 10MW (nameplate) of battery storage resources in 2025; and
- Assumes a host facility is identified such that a Combined Heat and Power project can be implemented by 2022.

This resource plan is based on the Company’s evaluation of the best available information at the time it was prepared. It is not a commitment to acquire any resource or undertake any course of action. Dramatic shifts in the power generating sector due to advancements in technology and emerging regulations make resource planning on this scale critical, but also challenging. Kentucky Power monitors regulatory and technological developments, as well as customer need, and will use the most current information to make all resource decisions, subject to all required regulatory approvals.

The Southern Wind Energy Association (“SWEA”) did not intervene but tendered public comments on February 16, 2017. SWEA “congratulate[d]” Kentucky Power “for performing an outstanding IRP.” SWEA stated that Kentucky Power’s Preferred Plan “responsibly incorporates low cost wind energy resources in the near term.” SWEA recommended

accelerated deployment of wind resources and other concepts related to wind resources for consideration in future IRPs.

The Attorney General of the Commonwealth of Kentucky and Sierra Club filed comments on Kentucky Power's IRP Report with the Commission on April 21, 2017. These comments were filed after multiple rounds of discovery.

The Attorney General's comments relate to the Rockport Unit Power Agreement, PJM Capacity Performance assumptions, and the cost-effectiveness of Kentucky Power's resource plan.

The Sierra Club's comments commend the Company for taking a number of important steps toward diversifying its energy portfolio while saving money for its customers. The Sierra Club at the same time suggested that Kentucky Power failed to consider a reasonable range of resource options and did not adequately evaluate DSM.

Kentucky Power appreciates the interest and participation by the Attorney General and Sierra Club in the IRP process. Nevertheless, a number of their comments miss the mark, are without legal basis, or otherwise should not guide the Commission's Staff's review of the IRP Report.

Kentucky Power acted reasonably and its 2016 integrated resource plan complies with 807 KAR 5:058.

#### LEGAL STANDARD

Sierra Club suggests that the Commission's review of the Company's IRP should be "guided by the overall requirement that utility rates are 'fair, just, and reasonable.'"<sup>1</sup> Sierra Club conflates the Commission's review of the Company's IRP Report with that of an application for rate adjustment. The Sierra Club's effort finds no support in Chapter 278 of the Kentucky

Revised Statutes, the Commission's regulations, or its precedent. Sierra Club relies on two statutes, KRS 278.030 and KRS 278.040, relating generally to a utility's right to "demand, collect, and receive fair just and reasonable rates" and the Commission's exclusive and plenary jurisdiction over utility rates.<sup>2</sup> Neither statute addresses the Commission's review of a utility's IRP report, nor requires that such review should "be guided by,"<sup>3</sup> much less turn on, whether the rates that would result *if the assumptions and resources described in the IRP occurred or were built* are "fair, just, and reasonable".<sup>4</sup>

The Company's IRP Report is a planning document. It is not an application for a certificate of public convenience and necessity to construct or acquire the identified resources, much less an application by the utility to recover the costs of the identified resources through rates. Traditionally, a utility's rates are adjusted by reviewing the utility's complete finances – revenues, expenses, and capital costs – and not simply an isolated aspect thereof.<sup>5</sup> Indeed, it is unclear how the Commission would determine in an IRP proceeding whether a particular resource plan would produce "fair, just, and reasonable rates" given the significant differences between the information required to be filed with the IRP<sup>6</sup> and that required for a general rate application.<sup>7</sup>

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<sup>1</sup> Sierra Club Comments at 4.

<sup>2</sup> *Kentucky Public Service Commission v. Commonwealth ex rel. Conway*, 324 S.W.3d 373, 377 (Ky. 2010), which Sierra Club also cites, likewise recognizes the Commission's plenary ratemaking authority.

<sup>3</sup> Sierra Club Comments at 4.

<sup>4</sup> *Id.*

<sup>5</sup> *In The Matter Of: Big Rivers Electric Corporation's Proposed Mechanism To Credit Customers Amounts Recovered In Judicial Proceedings Involving Fuel Procurement Contracts*, Case No. 94-453 at 5-6 (Ky. P.S.C. February 21, 1997). See also, *Kentucky Public Service Commission v. Commonwealth ex rel. Conway*, 324 S.W.3d 373, 382 & n. 23 (Ky. 2010).

<sup>6</sup> 807 KAR 5:058.

<sup>7</sup> 807 KAR 5:001, Section 16; 807 KAR 5:001; 807 KAR 5:011.

Commission precedent is clear that when reviewing a utility's IRP report, the Commission must determine whether the utility's actions in preparing the IRP were reasonable,<sup>8</sup> and whether the IRP provides for "an adequate and reliable source of electricity to meet forecasted electricity requirements at the lowest possible cost."<sup>9</sup> Kentucky Power did just that. In sum, the Commission must evaluate whether the assumptions and procedure used by the utility in preparing the IRP report were reasonable. The determination of whether the rates that would result from implementing the Preferred Plan would be "fair, just, and reasonable" is a determination for a later date based on a different record.

#### RESPONSES TO COMMENTS

Kentucky Power's resource plan provides for an adequate and reliable supply of electricity at the lowest possible cost given current regulations and reasonable expectations and assumptions of future costs and regulations. Because there is no need to make decisions regarding the purchase or disposition of any Kentucky Power capacity resources prior to the next IRP cycle, many of the arguments that the Attorney General and Sierra Club make in their comments, in addition to being factually incorrect and made without proper context, are premature.

Kentucky Power's responses to specific comments are included below.

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<sup>8</sup>See, Staff Report on the 2013 Integrated Resource Plan of Kentucky Power Company, Case No. 2013-00475 (2013 Staff Report) at 16-17, 34, and 62 (discussing the reasonableness of the Company's 2013 IRP forecasting, DSM analysis, and integration and plan optimization)..

<sup>9</sup> 807 KAR 5:058, Section 8 (1).

**A. Response To The Comments Of The Attorney General.**

1. The Attorney General's Efforts To Interject Unrelated Issues Concerning The Terms Of The Rockport UPA Exceed The Limited Scope Of This Proceeding (Sections A and C Of The Attorney General's Comments).

The Attorney General's comments regarding the Rockport UPA misapprehend both the nature and purpose of Staff's review of Kentucky Power's IRP Report. 807 KAR 5:058, Section 11(3) directs Commission staff to review the plan, the Company's responses to data requests, intervenor comments and Company responses, and "issue a report summarizing its review and offering suggestions and recommendations to the utility for subsequent [IRP] filings." A utility is then required to "respond to staff's comments and suggestions in its next integrated resource plan filing." 807 KAR 5:058, Section 11(4). As explained by Staff last year in connection with its review of the joint integrated resource plan of Louisville Gas & Electric Company and Kentucky Utilities Company:

resource planning is a dynamic ongoing process. Thus, this review is designed to offer suggestions and recommendations to ... [a utility] on how to improve ... [its] resource plan in the future. Specifically, Staff's goals are to ensure that:

All resource options are adequately and fairly evaluated;

Critical data, assumptions and methodologies for all aspects of the plan are adequately documented and are reasonable; and

The report also includes an incremental component noting any significant changes from the Companies' most recent IRP....<sup>10</sup>

Moreover, unlike almost every other proceeding at the Commission, the integrated resource planning process is limited to the Commission's staff.<sup>11</sup>

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<sup>10</sup> Staff Report, *In the Matter of: Joint Integrated Resource Plan Of Louisville Gas And Electric Company And Kentucky Utilities Company*, Case No. 2014-00131 at 3-4 (Ky. P.S.C. March 1, 2016).

The current Rockport UPA was approved by the Commission in 2004.<sup>12</sup> In approving the agreement, which was an extension of the then existing agreement that was scheduled to expire in 2004, the Commission explained:

The Commission previously expressed serious concern about what had been for some time Kentucky Power's intent to meet its native load requirements by purchasing power at market-based prices rather than extending the Rockport unit power contract. In Administrative Case No. 387, the Commission found that:

Reliance on power purchases that reflect market price volatility is not in the best interests of Kentucky consumers. AEP-KY must plan to meet its load by securing sufficient capacity that is not subject to market price volatility. Only by doing so will AEP-KY be able to maintain reasonable electric rates while mitigating to the extent possible market price and fuel price fluctuations.

Consistent with these Commission findings, Kentucky Power is now proposing a long-term extension of the Rockport unit power contract at a price that is not subject to market volatility. Although the price to be paid by retail customers for this power does reflect market forces since it is priced above cost of service, the price now being fixed will insulate retail ratepayers from the risk of future market price volatility.

Based on the evidence of record and being otherwise sufficient advised, the Commission finds that the 18-year extension of the Rockport unit power contract under the terms and conditions set forth in the Stipulation is reasonable and should be approved. Extending the purchase of 390 MW of power from Rockport, when combined with the 1,060 MW from Big Sandy, will provide Kentucky Power sufficient capacity, at reasonable and fixed prices, to meet its native load during most of the hours throughout this decade, with any shortfalls in capacity being met by purchases from affiliates through the AEP-East Power Pool.<sup>13</sup>

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<sup>11</sup> See e.g., Order *In the Matter of: Integrated Resource Planning Report Of Kentucky Power Company To The Kentucky Public Service Commission*, Case No. 2013-00475 at 1 (Ky. P.S.C. December 8, 2014) (“The Commission initiated this proceeding for its Staff to conduct a review of the 2013 Integrated Resource Plan (“IRP”) filed by Kentucky Power Company (“Kentucky Power”) pursuant to 807 KAR 5:058.”)

<sup>12</sup> *In the Matter of: Application of Kentucky Power Company For Approval Of A Stipulation And Settlement Agreement Resolving State Regulatory Matters*, Case No. 2004-00420 (Ky. P.S.C. December 13, 2004).

<sup>13</sup> *Id.* at 6-7.

More recently, the Commission rejected a similar effort by the Attorney General to involve the Commission in challenging and reviewing the terms of the Rockport Unit Power Agreement, including the return on equity.<sup>14</sup>

The Commission finds that the AG's recommendations to address at FERC the 12.16 ROE being used in the Sales Agreement and the establishment of an affiliate Charge-ROE-Reduction Rider should be denied. As with the Commission, FERC is mandated to set rates that are fair, just, and reasonable. While the Commission may not agree with the manner in which FERC establishes ROE, we take note that the terms of a FERC-approved contract have been found to legally constitute a fair, just, and reasonable rate. We also note that FERC's methods of setting an ROE have withstood prior challenges.<sup>15</sup>

Finally, the Rockport Unit Power Agreement expires December 7, 2022. Kentucky Power anticipates at this time making the determination during 2019 of whether to extend the Rockport UPA beyond 2022. The extension of the Rockport UPA, if that is the decision, or the acquisition of replacement capacity and energy, will be presented to the Commission for approval at that time. In addition, the effect of the Company's decision regarding the possible extension of the Rockport Unit Power Agreement on Kentucky Power's resource assessment and acquisition plan will be addressed in the Company's 2019 Integrated Resource Plan.

2. Kentucky Power's 2016 IRP Appropriately Examined The Cost-Effectiveness Of Its Supply Side Resources, Including An Analysis Of Ratepayer Cost Impacts. (Section B Of The Attorney General's Comments).

Notwithstanding the Attorney General's comments to the contrary, Kentucky Power considered the cost-effectiveness of its Preferred Plan. Indeed, inherent in any IRP is the consideration of the impact of various plans on the cumulative present worth of revenue

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<sup>14</sup> The Attorney General erroneously contends the return on equity under the Rockport UPA is 12.6 percent. *See* Attorney General's Comments at 2, 5, 6. The return on equity under the FERC-approved agreement is 12.16%. *See* Kentucky Power Company's Response to AG 1-4.

requirements over the study period. Specifically, the Company's capacity optimization model's objective function is to determine the least cost portfolio solution over the study period under a variety of pricing scenarios. Using these optimized portfolios as a guide, the Company created its Preferred Plan, which includes minor modifications to the optimized portfolio results as described in Section 5.3 of the IRP.

Kentucky Power's IRP Report also examined customer impact. The Company's IRP Report included Table 22, "Approximate Rate Impacts of the Preferred Plan" and Figure 30. Both compare the bill impacts of the Preferred Plan to a "do-nothing plan."

3. Kentucky Power Reasonably Considered The Impact Of PJM Capacity Performance Penalties Associated With Supply Side Resources, Including Wind Resources. (Section D Of The Attorney General's comments)

Kentucky Power's IRP Report considered the potential impact of the PJM Capacity Performance rule penalties for all resources, including intermittent resources such as wind. For wind resources the Company reflected the potential effect of the PJM Capacity Performance rule penalties for wind generating resources by reducing the planning capacity to 5% of the wind resources' nameplate capacity.<sup>16</sup> For example, if the wind resource was capable of producing 100MW for capacity planning purposes the Company assumed this resource would not be available for 5MW.

Kentucky Power also anticipates coupling wind and solar resources as allowed under PJM's capacity performance rule. Coupling renewable resources provides the "hedging" the Attorney General proposes as a means to protect against capacity performance penalties. Coupling the different generation profiles of wind and solar resources yields a "combined

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<sup>15</sup> *In the Matter of: Application of Kentucky Power Company for: (1) A General Adjustment of Its Rates for Electric Service; (2) An Order Approving Its 2014 Environmental Compliance Plan; (3) An Order Approving Its Tariffs and Riders; and (4) An Order Granting All Other Required Approvals and Relief, Case No. 2014-00396 at 81 (Ky. P.S.C. June 22, 2015).*

resource” with an increased ability to produce adequate power throughout the entire year. This coupling ability, together with the use of a five per cent capacity value for wind resources, mitigates the risk of capacity performance penalties.

**B. Response To The Comments Of The Sierra Club.**

1. Kentucky Power Used Reasonable Assumptions And Considered An Appropriate Range And Mix Of Resource Portfolio Options. (Section III A, B, and C of Sierra Club’s Comments).

Kentucky Power analyzed the practical spectrum of resources using reasonable cost assumptions, and the Company’s optimization model selected the least cost resources. The options considered included natural gas-fired generation, wind, utility and distributed solar, demand response, and energy efficiency. Kentucky Power is not a large utility, and as such, its portfolio of generating assets is relatively small. Considering the recent Commission-approved long-term investments in Kentucky Power’s generating portfolio, including the addition of a 50 per cent share of the Mitchell units and the conversion of Big Sandy Unit 1 to natural gas-fired operation, the opportunities for variation is limited. Accordingly, Kentucky Power's generating portfolio will be similar under multiple economic scenarios.

Kentucky Power evaluated optimum portfolios under four distinct economic scenarios and created two additional portfolios using a high-load and low-load sensitivities. The Company’s optimization model selected wind, solar, and EE resources in all scenarios, not for capacity purposes but due to their ability to provide lower costs to the customer. In addition, these resources provide value in further diversifying Kentucky Power’s resources.

Sierra Club's comments in substantial part turn on its claim that in 2106 Kentucky Power should have evaluated portfolios in which it elected not to extend the Rockport UPA when it expires December 7, 2022. The Company provided its rationale for not including portfolios

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<sup>16</sup> IRP Report § 4.4 (pages 107-108).

which do not renew the Rockport UPA, and has committed to perform such evaluations when the terms of any future Rockport UPA, and other resource options, are more certain. In particular, the Company explained that the actual decision to extend the UPA will be made in the future and that Kentucky Power is contractually committed under the Rockport UPA through 2022. There remains too much uncertainty with regard to load growth, carbon regulations, commodity pricing, capacity pricing, and future Rockport UPA costs to make any such evaluation meaningful at this time.

Similarly, any costs associated with the New Source Review Consent Decree through the expiration of the Rockport UPA in 2022 will be incurred without regard to whether the Company modeled an election not to renew the Rockport UPA. As a result, only post-2022 costs would be affected by the decision not to renew the agreement. Kentucky Power anticipates addressing in its 2019 Integrated Resource Plan these post-2022 costs, as well as the effect of the Company's decision regarding the possible extension of the Rockport UPA on Kentucky Power's resource assessment and acquisition plan.

2. The Company's Industrial Load Forecast Was Reasonable. (Section IV Of Sierra Club's Comments).

Kentucky Power's industrial forecast was developed using the best information available to the Company at the time it was developed. The forecasts for industrial load as a whole, which includes the coal mining sector, along with the Company's forecasts for other sectors served by Kentucky Power, remain reasonable.

When the Company evaluates its industrial sales forecast, it looks at the total of industrial load, and not simply the coal mining sector. Moreover, although the 2016 mining sector results were weaker than projected, first quarter 2017 results are improving due to higher natural gas prices and an improving market for metallurgical coal used in metals production. Finally, even if

Kentucky Power's actual coal mining load fell 100 GWh below the forecasts used in connection with its IRP Report, the Company's total load would still fall within the high/low scenarios presented in the IRP Report,<sup>17</sup> thereby further supporting the reasonableness of Kentucky Power's IRP process and the assumptions used in modeling.

Kentucky Power will continue to monitor its forecasts for each sector, including its coal mining load, to assess the need to adjust future forecasts.

3. Kentucky Power Reasonably Evaluated DSM/EE Resources And Appropriately Accounted For The Ability Of Such Programs To Save Customers Money. (Section V A, B, C and D Of Sierra Club's Comments)

The Company agrees that DSM resources are an integral part of an IRP analysis, and that they are appropriately evaluated alongside other both demand-side and supply-side resources.

Kentucky Power examined a broad array of DSM and energy efficiency resources. The Company considered a diverse set of DSM resources, including Residential, Commercial Energy Efficiency, Volt VAR Optimization, and Demand Response programs. The Company considered six Residential bundles and four Commercial bundles of energy efficiency resources.<sup>18</sup> In 2019, over 90 GWh of Energy Efficiency potential (or over 2.6% of Residential and Commercial load) was available to be selected by the model. Kentucky Power also had eight tranches of Volt VAR Optimization available, representing over 17MW of potential demand reduction and 71 GWh of energy savings. Kentucky Power likewise modeled demand response for both residential and commercial customers with the potential of selecting almost 2,000 customers each year to participate in the demand response program.

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<sup>17</sup> IRP Report at 179.

<sup>18</sup> IRP Report § 4.5.3.1 (pages 109-114).

Kentucky Power also examined the type and quantity of these resources that would benefit its customers by using four commodity pricing conditions (Mid Band, Low Band, High Band, and No Carbon) and two load conditions (low load and high load).<sup>19</sup> The resources selected under each of the resulting six scenarios are displayed in Tables 19 and 20.<sup>20</sup>

The six scenarios modeled indicated the cumulative addition by 2031 of DSM/EE resources ranging between 57 MW (Mid Band)<sup>21</sup> and 75 MW (High Load).<sup>22</sup> Consistent with these results, Kentucky Power's Preferred Plan identified the cumulative addition of 70 MW of DSM/EE resources by 2031. The IRP Report thus reflects a wide array of future conditions that the Company may experience, while the Preferred Plan represents a reasonable path forward based on that evaluation.

Sierra Club also argues that Kentucky Power should have evaluated the addition of utility-sponsored industrial energy efficiency resources as part of its modeling. The Company terminated its industrial DSM programs because of a lack of customer participation. The Company has not received any requests to reinstate the programs. The IRP Report assumes that industrial customers will self-invest in energy efficiency measures based upon customer-specific economic evaluation regardless of the existence of utility-sponsored energy efficiency programs.<sup>23</sup> It is a reasonable assumption that has been borne out by experience.

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<sup>19</sup> IRP Report § 5.2.2.2 (page 134).

<sup>20</sup> *Id.*

<sup>21</sup> IRP Report § 5.2.2.1 at 136 (Table 19).

<sup>22</sup> IRP Report § 5.2.2.2 at 137 (Table 20).

<sup>23</sup> IRP Report § 4.5.1 (page 108).

Finally, notwithstanding Sierra Club's concerns, the Company's Preferred Plan, including the cumulative addition of 66 MW of DSM/EE resources by 2031, provides for customer savings as compared to Kentucky Power's continued reliance on its existing resources.<sup>24</sup>

3. Kentucky Power's IRP Report Appropriately Considered Wind Resources And Its Preferred Plan Recommends Reasonable Levels Of Wind Resources. (Section VI. of Sierra Club's comments)

The IRP Report does not unreasonably limit wind resources. Wind resources were selected by the IRP model because they lower costs to customers over their lifetime.<sup>25</sup> Although in the abstract it may seem prudent to add even higher quantities of wind resources than what was included in the Preferred Plan, there are practical limitations that must be considered.

First, the 75 MW annual limit on the addition of wind resources "is based on KPCo's ability to plan, manage and develop either the construction or procurement of these resources."<sup>26</sup> Although the Company's affiliates have experience with wind resources, there remain limitations on the time required to implement these projects, including internal processes such the issuance and review of Requests for Proposal, due diligence, and the contracting processes. In light of these factors, the 75 MW annual limit on the addition of wind resources is reasonable.

Second, the 300 MW limit on wind resources over the planning period was determined based on the Company's "Going-In" capacity position which indicated the Company will need capacity resources of just over 1,080MW in 2031.<sup>27</sup> Using this value as a baseline, and based on guidance from the United States Department of Energy's Wind Vision Report,<sup>28</sup> which suggests that transmission grids should be able to support 20 per cent to 30 per cent intermittent resources

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<sup>24</sup> IRP Report § 5.3.2 (pages 139-141); IRP Report at 141 (Figure 30).

<sup>25</sup> See Kentucky Power's Response to AG 1-2(b).

<sup>26</sup> IRP Report at 127.

in the 2020 to 2030 time frame, the Company limited the addition of wind resources to 30% of the 1,080 MW of capacity required in 2031.<sup>29</sup>

Sierra Club argues Kentucky Power misapplied the Wind Vision Report by treating the results surveyed in the report as a “hard cap.”<sup>30</sup> Sierra Club errs. It is not unreasonable to assume some limit on the transmission grid’s ability to support intermittent resources,<sup>31</sup> and Kentucky Power used the report’s findings as a reasonable proxy for the amount of wind resources that could be supported by the transmission grids.<sup>32</sup> Calling it a “hard cap,” as does Sierra Club, does not make the limit unreasonable.

Further, even if higher penetration levels of wind resources were possible, the costs associated with upgrades to transmission systems that would be necessary to support large amounts of wind are not yet fully quantified. In particular, the United States Department of Energy’s Wind Vision Report notes, in the same section referenced by the Sierra Club in its comments, that higher penetration levels bring with them rising integration costs:

Wind integration does not come without costs and impacts, however, including power system balancing and scheduling flexibility.... These cost calculations are complex and specific to system and region.<sup>33</sup>

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<sup>27</sup> IRP Report at 62.

<sup>28</sup> [https://energy.gov/sites/prod/files/2015/03/f20/wv\\_full\\_report.pdf](https://energy.gov/sites/prod/files/2015/03/f20/wv_full_report.pdf) at 12 retrieved May 4, 2017 (“Wind Vision Report”).

<sup>29</sup> IRP Report at 127.

<sup>30</sup> Sierra Club Comments at 22-23.

<sup>31</sup> Wind Vision Report at 84 (“Many studies conducted in Europe and the United States indicate that wind power contributions up to and above 20% are technically possible, but with rising integration costs.”)

<sup>32</sup> IRP Report at 127 (“DOE’s Wind Vision Report ... suggests from numerous transmission studies that transmission grids should be able to support 20% to 30% of intermittent resources in the 2020 to 2030 time frame.” The model was able to select up to 30 per cent of generation capacity resources as wind-powered by 2031.)

<sup>33</sup> Wind Vision Report at 84.

Any additional costs, such as integration or transmission costs, associated with wind energy would only make these resources less economic for customers, and could potentially lead to lower levels being selected by the IRP model.

Kentucky Power's cost assumptions for wind resources were reasonable and appropriate. The Sierra Club references<sup>34</sup> an industry report and states that wind costs will decline by approximately 10 per cent to 20 per cent by 2020, and 20 per cent to 40 per cent through 2030.<sup>35</sup> However, this same report underscores the fact that these forecasts do not account for project-specific constraints:

Experts were asked to ignore project-to-project variation and instead to focus on factors that affect the industry as a whole, e.g., changes in wind energy technologies, markets, and policies.<sup>36</sup>

Wind project economics are heavily dependent on the output of the site, which in turn is dependent on the project's location. Yet, these considerations were excluded in the cost reductions cited in the report.

While it is possible that changes in technology, markets, and policies could have downward pressure on wind resource prices, the reality is that there are only a certain amount of wind projects located in ideal locations. Over time, as the best sites are developed, the remaining locations for wind projects will have less desirable characteristics that will lead to lower capacity factors. These lower capacity factors will

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<sup>34</sup> Sierra Club Comments at 23.

<sup>35</sup> Lawrence Berkeley National Labs, National Renewable Energy Laboratory, and IEA Wind, Forecasting Wind Energy Costs & Cost Drivers: The Views of the World's Leading Experts, LBNL-1005717 (June 2016) at 13, available at [https://www.ieawind.org/task\\_26\\_public/PDF/062316/lbnl-1005717.pdf](https://www.ieawind.org/task_26_public/PDF/062316/lbnl-1005717.pdf).

<sup>36</sup> *Id.* at 12.

tend to drive up the Levelized Cost of Energy for wind resources and hence their increasing cost over the planning period.

4. Kentucky Power Credibly Modeled Utility-Scale Solar Resources And Included Reasonable Levels In Its Preferred Plan. The Company's Distributed Generation Assumptions Also Are Reasonable. (Section VII. of Sierra Club's comments)

The IRP Report did not unreasonably constrain large-scale solar resources. As with wind resources, the Company accounted for internal and external limitations.<sup>37</sup>

Over time, the best solar projects will be developed first. As these projects are completed the remaining available sites may have less desirable characteristics, potentially leading to lower capacity factors, which in turn would drive up their Levelized Cost of Energy. This means that the pool of suitable and economic projects is not unlimited. When all factors are considered, Kentucky Power reasonably assumed that an annual limit exists for the quantity of solar resources that can be implemented.

The Company's assumptions for Distributed Generation likewise are reasonable and valid. Although the cost of rooftop solar, which was the Distributed Generation resource modeled, is expected to decline throughout the planning period, rooftop solar is forecasted to be economic only for a small subset of Kentucky Power customers. Applying the full net-metering credit, and assuming a discount rate (cost of capital) of only 10%, rooftop solar is not economic until 2025 for customers.<sup>38</sup> Importantly, a discount rate of 10% or less would only be applicable to the Company's customers with no credit card debt, which likely comprises only a small portion of customers.

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<sup>37</sup> IRP Report at 122 ("In practice, solar facilities are not added in an unlimited fashion given siting and regulatory requirements).

<sup>38</sup> IRP Report at 82 (Figure 13).

At the time the IRP Report was prepared the Company had less than 0.2MW<sub>AC</sub> of installed rooftop solar.<sup>39</sup> The undesirable economics of this resource in the near future, combined with the low penetration levels existing today, corroborate the rooftop solar forecast<sup>40</sup> used in the IRP Report.

#### CONCLUSION

Kentucky Power evaluated its future resource planning obligations building on reasonable load forecasts, demand side resource options, as well as supply side alternatives. Following its review and resource optimization evaluation, Kentucky Power developed its Preferred Plan to include additional wind and solar resources, as well as expanded DSM/EE programs.

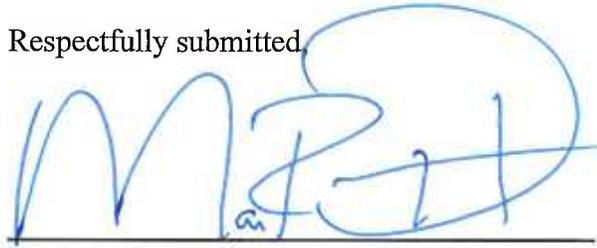
The IRP Report demonstrates that Kentucky Power can meet its customers' capacity and energy requirements at the lowest possible cost with existing resources and modest investments in renewable resources and energy efficiency. Kentucky Power's IRP Report demonstrates that it complied with the requirements of 807 KAR 5:058. The Attorney General's concerns and Sierra Club's comments to the contrary should not guide Commission Staff's review of this IRP Report.

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<sup>39</sup> IRP Report at 114 (Figure 25).

<sup>40</sup> The IRP Report uses the report entitled *Solar PV Capacity Addition Forecast For PJM States: 2016-2031*. The report was developed by IHS Inc. for PJM. See IRP Report at 114.

Respectfully submitted,



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Mark R. Overstreet  
STITES & HARBISON PLLC  
421 West Main Street  
P. O. Box 634  
Frankfort, Kentucky 40602-0634  
Telephone: (502) 223-3477  
[moverstreet@stites.com](mailto:moverstreet@stites.com)

Kenneth J. Gish, Jr.  
STITES & HARBISON PLLC  
250 West Main Street, Suite 2300  
Lexington, Kentucky 40507  
Telephone: (859) 226-2300  
[kgish@stites.com](mailto:kgish@stites.com)

COUNSEL FOR KENTUCKY POWER  
COMPANY